Joseph A. Cook

The University of Alaska Mammal Collection

The following presentation was given at a recent Alaska National Park Service resource managers' annual meeting. The meeting focused on the preservation of museum collections and the documentation of all park natural resources that exist in university museums and other museums worldwide. Emphasis was put on off-site natural history collections being preserved and accessible for future generations, as well as used for documentation of past research projects, for further research, and for verification of completed research.

From a curatorial point of view, everything that resource managers do affects the park and system support curators—because of the specimens and the associated records, or projects that only generate records. The research being done in the NPS benefits not only the parks, but others as well. The results of the work are often kept by the institutions who initiated the research in the first place, rather than deposited at the parks in which the work was done.

Partnerships are now being touted as a new tack for the NPS to take. However, partnerships have been in effect for years between the NPS and countless institutions of higher learning. There are collections from the old and new Alaska parks all over the world. All we need to do now is forge a closer relationship with these institutions and find out what was collected in the past so we can add to our existing database. There is a lot more known about the parks, particularly the old ones, that we have documented in our own catalog system, the Automated National Catalog System (ANCS). The Branch of Museum Services in the former Alaska Region has been searching for a number of years now (with varying degrees of success). Each park needs to continue searching for those old collections, getting the information from each university museum into its own computer systems.

The University of Alaska Museum is one of those long partnerships. The Museum has been preserving NPS collections, researching them, and making the information available to everyone. Dr. Joseph Cook, Curator of Mammalogy, was at the meeting to talk about the continuing use of natural science collections for research, to know the park resources better, and to continue to preserve the park database throughout the years of limited staffing and funding in a continued partnership that benefits the University of Alaska and all of the parks.

—Jean H. Rodeck

The relationship between national parks in Alaska and the University of Alaska Museum (UAM) has been evolving rapidly in the past few years. Questions we are frequently asked relate to what is the purpose of all those musty old museum collections, and do we really need to collect more specimens on national park lands? These are important concerns and the importance of a well-preserved (and researched) historic record (i.e., museum specimens) for interpreting the rapid changes that the earth's biota is now experiencing should be explored.

Well-annotated natural history collections are critical to developing an understanding of a particular flora or fauna. These collections are essentially libraries full of information on organisms. Each carefully prepared specimen may be thought of as a book that contains a set of data documenting that individual (species or population) at a particular locality on a particular date. The library analogy is limited, however, as none of the museum "volumes" can be replaced. We cannot go back in time and recollect a particular specimen at a particular location.

One of the most basic functions of museum collections is to document the earth's biotic diversity and specimens provide the physical documentation of species richness both spatially and temporally. Surprisingly, there is considerable diversity that remains to be documented in North America and our museum collections are woefully inadequate. Within the past five years, the UAM has documented the existence of three mammal species previously unknown in Alaska. One of these, the tiny shrew (Sorex minutissimus), was previously unknown in all of North America, but when museum collections were recently re-examined by a Russian specialist, several specimens of the tiny shrew were identified. One was collected in the Susitna Valley more than 15 years ago.

While national parks comprise a significant portion of Alaska, most of these areas have never been properly surveyed for biotic diversity. These surveys should be conducted in a systematic and rigorous manner. Series of specimens from particular localities are necessary to examine variations within and among species (e.g., age, sex, color, genetic). These specimens should be represented by a variety of preparations (skin, skeleton, frozen

tissues, parasites, etc.) and archived in a museum where they will be available for a variety of investigations. Museum work is generally poorly understood and unfairly exaggerated, even within the scientific community. The UAM has about 35,000 mammal specimens archived but given the size of Alaska, its complex landscape, and the number of years of collecting this represents, the UAM has a very inadequate and uneven representation of Alaska's mammal diversity. When compared to levels of natural mortality and accidental kills, museum collecting has an insignificant impact on wild populations.

Specimens represent historical populations and their value increases dramatically through time. This is particularly true as the diversity of many localities is degraded. Temporal changes in biotic diversity can be documented effectively only if extensive collections are periodically archived. We have lost the opportunity to document changes in the biota of many areas because no baseline inventory was ever conducted. Through cooperative specimen-based projects, national park biologists have been particularly important in helping to establish baseline data on wild populations in Alaska's relatively undisturbed environments. These data will be invaluable when assessing changes due to human impact and natural disturbance of the environment.

Today, museums are key to a veritable explosion of different kinds of studies on biotic diversity. For instance, in the past two years, 32 loans of more than 1,500 specimens have been made from the Alaska Frozen Tissue Collection (AFTC). The Centers for Disease Control in Atlanta has used 570 AFTC samples from rodents in efforts to understand the history and epidemiology of the Hantavirus disease. Other samples from declining marine mammal populations have been used to test for canine distemper. With PCR (polymerase chain reaction) and other innovations in the study of DNA, we now can examine genetic variation in populations of animals that were collected during different time periods, thus providing a more rigorous view of temporal genetic variation. For example, known contact zones between taxa can be reanalyzed for temporal stability if specimens from the contact zone were collected at regular intervals.

Ancient DNA studies on mammoth specimens from Alaska are underway in a German laboratory. Isotope analysis of bones allows investigators to examine diets of individual specimens, thus opening a whole range of studies to the paleo-ecologist. The effects of climate change or other perturbations on the distributions of species may be critically evaluated only with voucher specimens. These kinds of studies are underway now using museum specimens. We cannot even predict what kinds of questions new technological advances will allow. Currently, the UAM Mammal Collection forms the basis for 11 MS and PhD theses at UAF and at least 12 at other institutions.

Recent cooperative research projects in the UAM Mammal Collection have focused on 1) establishing baseline data on small mammal populations at regular (annual) intervals, 2) the zoogeography of Southeast Alaska, and 3) the relationships between the mammals of Alaska and those of eastern Russia. Field work supported by Glacier Bay National Park and Preserve, Bering Land Bridge National Preserve, Denali National Park and Preserve, Wrangell-St. Elias National Park and Preserve, and Gates of the Arctic National Park and Preserve, and other federal agencies, have been crucial to the development of this resource, now among the finest regional mammal collections worldwide.

Dr. Joseph A. Cook is the Curator of Mammals at the University of Alaska Museum in Fairbanks. He has worked with NPS collections extensively, and participated in a workshop with Alaska resource managers, sharing the above information and inviting more use of the collections from the national parks housed at the Museum. He can be reached through Internet, ffjac@aurora.alaska.edu. The address of the Museum is 907 Yukon Drive, Fairbanks, AK 99775-1200, 907-474-7505.

H. Dale Durham

Uses of Museum Collections

As visitors, we bring to a park or museum information and values that greatly affect our vision and focus. We may not see what is before us because our expectations are different or we are letting our previous experiences influence our view. This analysis holds true whether we are casual visitors or researchers.

As educational and resource management professionals, we must consider the various elements of use and impacts on our park museum collections. We acquire, prepare, and preserve museum collections to be used, but our collections may not be used immediately or automatically. The most important use of our collections may come 50 or 100 or 1,000 years from now.

The value and utility of park museum objects depends on their documentation. Few visitors